CHAPTER 5
CONCLUSION AND SUGGESSION

5.1 Conclusion

This study was concentrated to investigate different factors that affect the viability of probiotic bacteria in soymilk yogurt during low storage temperature. After finding the optimal formulas to produce soymilk yogurts with an addition of *B. bifidum* or *L. acidophilus*, the study investigated different nutrient compounds that could improve the viability of probiotic bacteria during storage. Throughout the study, low temperature storage of 4^0C was used, because this is the most common storage temperature to keep yogurt products. During the storage period, yogurt samples were analyzed for their physical, chemical and microbiological properties, including the viable numbers of *S. thermophilus, L. bulgaricus, B. bifidum* and *L. acidophilus*. From the analysis data, several conclusions could be made, including:

1. The growth curves of 2% (w/v) yogurt starter cultures and 2% (w/v) probiotic bacteria in soymilk yogurt incubated at 43^0C for 42 h showed that *S. thermophilus, L. bulgaricus, B. bifidum* and *L. acidophilus* could grow in the specific medium with the highest growth rate within the first 10 h incubation period. At the same time, these microorganisms produced lactic acid causing an increase in total titratable acidity values and a decrease in pH values.

2. Physical, chemical and microbiological changes of a basic formula of soymilk yogurt during storage at 4^0C for 21 days exhibited that the acidity of the soymilk yogurt continued to increase during the storage period. This result might affect the viabilities of *S. thermophilus* and *L. bulgaricus* that were found to be reduced for up to 2.72 and 2.26

log CFU/ml, respectively. At the same time, the syneresis of the soymilk yogurt was significantly ($p \leq 0.05$) increased and the viscosity was significantly ($p \leq 0.05$) reduced.

3. The study about finding optimum soymilk yogurt formulas that support the viability of probiotic bacteria during refrigerated storage for 21 days was conducted in 2 sections. The first section was concentrated in screening and dividing the soymilk yogurt ingredients into a major or minor factor and the second section was used to find the suitable levels of the major factor that gave a significant effect on the survival of the probiotic bacteria. The results of this study displayed that the soymilk yogurt added with *B. bifidum* had 3 major factors, including RSM, sugar and pH levels and 4 minor factors, which were carboxymethylcellulose, kappa–carrageenan, guar gum and soymilk. The optimal formula for the soymilk yogurt added with *B. bifidum* was 9% (w/v) RSM, 18% (w/v) sugar, 15% (w/v) soymilk, 0.3% (w/v) carboxymethylcellulose, 0.3% (w/v) kappa–carrageenan, 0.3% (w/v) guar gum and a yogurt pH level before adding *B. bifidum* of 5.2. For the soymilk yogurt added with *L. acidophilus*, it was found that the soymilk yogurt had 2 major factors of RSM and sugar and 5 minor factors, including CMC, kappa–carrageenan, guar gum, soymilk and pH levels. The optimal formula for the soymilk yogurt added with *L. acidophilus* included 15% (w/v) RSM, 12% (w/v) sugar, 15% (w/v) soymilk, 0.3% (w/v) carboxymethylcellulose, 0.3% (w/v) guar gum and a yogurt pH level before adding *L. acidophilus* of 4.9.

4. For the study about the effect of nutrient compounds (fibersol–2, fructo–oligosaccharide and tomato extract) on the viability of probiotic bacteria in soymilk yogurt during storage at chilled temperature for 21 days, the data indicated that tomato extract was the best prebiotic compound in maintaining the viabilities of probiotic bacteria both for *B. bifidum* and *L. acidophilus* in soymilk yogurt. Reductions in the viable counts for up to 1.45 and 1.41 log CFU/ml for *B. bifidum* and *L. acidophilus*, respectively, were recorded when 5%(w/v) tomato extract was added into the soymilk yogurts.

5.2 Recommendation

1. During the production of soymilk, soaking seeds in a base solution, such as sodium bicarbonate ($NaHCO_3$) should be followed by a proper washing method. A good washing procedure would reduce a production of bubbles in soymilk.

2. To adjust the pH values of soymilk yogurts before an addition of probiotic bacterium with 0.01N NaOH or 0.01N HCl, the processing step should be done carefully to avoid any significant effect from the solution acidity to the texture of the soymilk yogurts.

3. The research and development of soymilk yogurt formulas added with probiotic bacteria in this thesis were mainly focused on the physical, chemical and microbiological properties of the soymilk yogurt. A further research for developing the sensory property of the soymilk yogurt according to the consumer demand may need to be carried out, particularly for the food industries.